

THE IDENTITY OF *AHUAUTLEA MEXICANA* DE LA LLAVE
(HETEROPTERA, CORIXIDAE)

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Olivares (1964) proposed the synonymy of *Krizousacorixa femorata* (Guérin-Méneville) with *Ahuautlea mexicana* de la Llave. This proposal was based on wide generalizations of de la Llave's (1832) text, and it was unfortunate that Sailer (1977) adopted the synonymy in the preface to the reprint edition of Hungerford's (1948) monograph on the Corixidae of the western hemisphere. In the following, I am reviewing the literature concerned, and clarifying the identity of the species of Corixidae involved.

The whole matter is connected to the old Mexican habit of making use of aquatic Heteroptera collected from Lake Texcoco. Adult water bugs have been used mainly as food for caged birds, but when prepared in a particular way they have also been used for human food. Eggs of these insects have also been collected, and when dried, they have been used as flour from which a particular bread or cake was baked. The original Aztec word for these water bugs was "axaxayácatl" (also spelled "axayácatl"). In Mexican markets these insects have been called "mosca," and the eggs "ahuautle," but in the literature the name "ahuautle" has been generally used for both the insects and the eggs.

Already in 1600s these bugs were mentioned in the literature (cf. Guérin-Méneville, 1862; Champion, 1901; Hungerford, 1948), but at that time they were erroneously believed to be flies: "De Axayacatl, seu musca palustri aquosa facie constante," and the eggs were called "muscarum ovae" (Guérin-Méneville, 1862). The mistake was probably due to the market sellers who, besides calling the insects "mosca," also called them "mosquitos" (cf. Virlet d'Aoust, 1858; Guérin-Méneville, 1862). When it is known that salt flies, genus *Ephydra*, were also collected from Lake Texcoco and sold on the markets (Deevey, 1957; Dibble and Anderson, 1963), the mistake is rather understandable.

The first description of a species of Corixidae sold on the markets was that by Say (1832), who described *Corixia mercenaria*. There has been some confusion about the actual printing year and, for instance, Lundblad (1928) referred to "Say 1831," but Hungerford (1948) to "Say 1832." Indeed, front page of the paper gives the date as Dec. 1831, but in the text Say himself referred to another one of his papers from January 1832; thus, the description of *C. mercenaria* evidently was not published until in early 1832. The

original specimens of *C. mercenaria* have been lost, but the species has been interpreted very well by several authors (Champion, 1901; Lundblad, 1928; Jaczewski, 1931; Hungerford, 1948). In addition, Lundblad (1928) based his description of the genus *Corisella* mainly in *C. mercenaria*, and Hungerford (1948), selecting *C. mercenaria* as the type species of *Corisella*, also chose a whole series of neotypes labeled "Mexico, Lake Texcoco, D.F., 7-26-37, H. D. Thomas; Purchased as Hautele collected in L. Texcoco." These are located in the Snow Entomological Museum, University of Kansas, and to comply with the Code, I have labeled one male specimen to be *the neotype*.

A second description of a species from the "ahuautle" appeared in July 1832: *Ahuautlea mexicana* de la Llave 1832. There is no doubt that the animal was one of the small species of Corixidae, but according to the characters given it is not possible to recognize the species. The description was translated to French (de la Llave, 1862), and Guérin-Méneville (1862) commented on the description, but he was also unable to recognize the species. De la Llave (1832) gave no reference to where his material was deposited, and no subsequent indications exist. The description of *A. mexicana* was quoted in full by Orozco y Berra (1864), but the species remained unnoticed by hemipterologists until late 1950s.

A third species from the market product, *Corixa femorata*, was described and discussed by Guérin-Méneville (1857a, 1857b, 1857c, 1858). The type specimens were thought to have been lost until Hungerford (1929) located them in the Paris Museum, and then described a new genus, *Krizousacorixa*, in which *C. femorata* became the type species (Hungerford 1930). Referring to a letter by Mr. Laverrière, mailed in 1858 from Mexico, Guérin-Méneville (1862) further explained that the market product was sold in two qualities: "mosca grande," which consisted of individuals of *Notonecta unifasciata* Guérin-Méneville, and "mosca corriente," consisting of individuals of *Corixa femorata* and *C. mercenaria*; identification of the species was possible because the letter included parts of the insects.

Ancona (1933) has been the only investigator who has studied the composition of the market product by sampling Lake Texcoco itself. In the 1930s the main species were *Notonecta unifasciata* Guérin-Méneville and *Krizousacorixa azteca* Jaczewski, but in small numbers *K. femorata* (Guérin-Méneville), *Corisella mercenaria* (Say), and *C. texcocana* Jaczewski [= *C. tarsalis* (Fieber)] were also taken. Rather surprisingly, Ancona (1933) did not report *C. edulis* (Champion), although it has been included in the product both before and after the 1930s (Champion, 1901; Olivares, 1964). On the other hand, in late 1800s Kirkaldy (1898) reported only one species of Corixidae, *C. mercenaria*, and according to Olivares (1964) there were only two species in the 1960s, *C. mercenaria* and *C. edulis*. Differences in the species composition may have been caused by large scale changes in

ecological conditions of the lake (Olivares, 1964), but differences in the collecting sites may have affected the results as well.

Confusion about the species arose when Deevey (1957) found de la Llave's (1832) description of *Ahuautlea mexicana*. Deevey claimed that *A. mexicana* "appears to be the correct name, though it has been ignored by zoological writers; it has priority over the generic name *Krizousacorixa* Hungerford 1930 and the specific name *Corixa femorata* Guérin-Ménéville 1857." Deevey (1957) did not present any facts to support this claim but, on the contrary, in the next paragraph he explained that Ancona's (1933) study "suggests that the *axayácatl* is ordinarily *Krizousacorixa azteca* Jaczewski, 1931; it may also be *K. femorata* (Guérin-Ménéville, 1857), while *Corisella texcocana* Jaczewski and *C. mercenaria* (Say) may be less important components of the product, along with the backswimmer *Notonecta unifasciata* Guérin-Ménéville." Further, in a caption for a reproduction of an old drawing Deevey wrote: "Fig. 220, the first figure of a corixid water bug, the *axayácatl*, *Ahuautlea mexicana* de La Llave (? = *Krizousacorixa azteca* Jaczewski)." The figure, also reproduced in Dibble and Anderson (1963), presents aquatic insects which look like hybrids between Dytiscidae and Corixidae, and also possess characters of Gyrinidae, Naucoridae, and Notonectidae; if they were originally drawn from Corixidae, the result certainly was not very convincing, and gives no clues for the species in question.

Olivares (1964), referring to de la Llave (1832) and Deevey (1957), then firmly proposed the synonymy of *K. femorata* with *A. mexicana*. He had no new evidence for the identity of *A. mexicana*, but he very freely interpreted de la Llave's original text and, for instance, claimed that the description referred to "males with greatly thickened femur" (obviously meaning the foreleg femur, which is greatly thickened in males of *Krizousacorixa*). However, de la Llave (1832) did not distinguish characters separately for males and females, and further, by calling all the segments of the legs as 'tarsi,' he described the forelegs as short and thick, consisting of two 'tarsi,' of which the second one was spoon-shaped and fringed by hairs ("Los don anteriores son cortos y gruesos compuestos de dos tarsos, de los que el segundo termina dilatándose en forma algo cóncava ó acucharada, y rodeado este órgano por una pestana de cercias"). Thus, because the first 'tarsus' (=femur) was not described any thicker than the second one (=tarsus, apparently including the tibia also), the structure of the forelegs gives no further evidence for the identity of the species in question. The characters of the head and the form of the eyes of *A. mexicana*, also considered specific by Olivares (1964), fit in any of the species reported from the "ahuautle." Thus, no facts remain to support the proposed synonymy.

In the original description of *A. mexicana* de la Llave (1832) gave one rather confusing character: a black spot on the pronotum. Such a pronotal

spot does not appear in any of the species in the "ahuautle," but yet it gives a good clue for the genus in question. In both *Krizousacorixa* and *Corisella*, as well as in many other Corixids, the color of the *mesonotum* varies from pale to black according to the development of the flight muscles (cf. Young, 1965). In the genus *Krizousacorixa* the pronotum is not translucent, and the darkness of the mesonotum cannot be seen without lifting the pronotum. In the genus *Corisella*, in contrast, the pronotum is rather translucent and darkness of the mesonotum (especially in the main flightless form which is common and in which the mesonotum is black posteromedially only) gives the insects an appearance whereby they seem to have a black spot on the pronotum. Say (1832) did not mention this character in the original description of *C. mercenaria*, but in the first redescription of the species Champion (1901) both mentioned and illustrated it. Rather surprisingly, Champion (1901) did not mention the spot for *C. edulis*, in which it is often equally well visible. Thus, it is obvious that de la Llave (1832) was dealing with a species placed today in the genus *Corisella*. Of the three species of *Corisella* reported from the "ahuautle," *C. tarsalis* can be excluded because it has embrowned hind leg tarsi, and the legs of *A. mexicana* were described pale. However, in lack of original specimens it will never be possible to say which one of the remaining two species was involved. *C. mercenaria* seems more probable because it was described only a few months earlier than *A. mexicana*, while *C. edulis* was not described until some 70 years later; during the past 150 years *C. mercenaria* seems to have occurred in Lake Texcoco continuously, but *C. edulis* has been lacking from the lake at least periodically (e.g. Ancona, 1933). To clear up the confusion I hereby designate the specimen already designated as the neotype of *C. mercenaria*, also as the neotype of *A. mexicana*. This action fixes *Ahuautlea mexicana* de la Llave 1832 as a junior objective synonym of *Corixia mercenaria* Say 1832.

The generic name *Ahuautlea* de la Llave 1832 is older than the generic name *Corisella* Lundblad 1928. However, the latter is well known and widely used (e.g. Applegate, 1973; Brooks and Kelton, 1967; Hilsenhoff, 1970; Hungerford, 1948; Jansson, 1976; Lansbury, 1955, 1960; Scudder, 1976; Wilson, 1958; and many others), while the former has appeared only in the wrong combination as a proposed replacement for *Krizousacorixa* (Deevey, 1957; Olivares, 1964; Sailer, 1977). To avoid further confusion about the matter, I shall write to the Commission on Zoological Nomenclature and ask for suppression of the generic name *Ahuautlea* in favor of the generic name *Corisella*.

Changes in the names used for the species of Corixidae reported from the "ahuautle" can be summarized as follows (for complete references before 1948 and not included in the literature cited, see Hungerford 1948).

Corisella edulis (Champion)

Corixa edulis Champion 1901.

Arctocorisa edulis, Kirkaldy 1909.

Arctocorixa edulis, Van Duzee 1917, Hungerford 1925, Blatchley 1926, Hungerford 1928.

Corisella edulis, Lundblad 1928, 1929, Jaczewski 1931, Millspaugh 1939, Griffith 1945, Hungerford 1948, Lansbury 1955, Wilson 1958, Olivares 1964, Hilsenhoff 1970.

Corisella mercenaria (Say)

Corixia mercenaria Say 1832.

Ahuautlea mexicana de la Llave 1832, 1862. **New Synonymy.**

Corixa mercenaria, Fieber 1851, Guérin-Méneville 1857, 1858, 1862, Uhler 1876, Kirkaldy 1898, Champion 1901.

Arctocorisa mercenaria, Kirkaldy 1909.

Arcotocorixa mercenaria, Van Duzee 1917, Blatchley 1926.

Corisella mercenaria, Lundblad 1928, 1929.

Corixa mercenaria, Hungerford 1929.

Corisella mercenaria, Jaczewski 1931, 1933, Ancona 1933, Hungerford 1948, Deevey 1957, Olivares 1964.

Corisella tarsalis (Fieber)

Corisa tarsalis Fieber 1851.

Corixa tumida Uhler 1877.

Corisa tumida, Gillette 1895.

Arctocorisa tarsalis, Kirkaldy 1909.

Arctocorixa tarsalis, Van Duzee 1917.

Sigara tarsalis, Lundblad 1931.

Corisella texcocana Jaczewski 1931, Ancona 1933.

Corisella tumida, Walley 1936.

Corisella tarsalis, Hungerford 1948.

Corisella texcocana, Deevey 1957.

Corisella tarsalis, Brooks & Kelton 1967, Hilsenhoff 1970, Applegate 1973, Jansson 1976, Scudder 1976.

Krizousacorixa azteca Jaczewski

Krizousacorixa azteca Jaczewski 1931, Ancona 1933, Poisson 1935, Hungerford 1948.

Ahuautlea mexicana, Deevey 1957 (erroneous synonymy).

Ahuautlea azteca, Olivares 1964, Sailer 1977 (erroneous combination).

Krizousacorixa femorata (Guérin-Méneville)

Corixa femorata Guérin-Méneville 1857, 1858, 1862, Virlet d'Aoust 1858, Kirkaldy 1898.

Corixa abdominalis, Champion 1901 (erroneous synonymy).

Arctocorisa femorata, Hungerford 1925.

Corixa femorata, Hungerford 1929.

Krizousacorixa femorata, Hungerford 1930, Jaczewski 1931, Ancona 1933, Hungerford 1948.

Ahuautlea mexicana, Deevey 1957, Olivares 1964, Sailer 1977 (erroneous synonymy).

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